

AGRICULTURAL NEWS LETTER

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This publication contains information regarding new developments of interest to agriculture based on laboratory and field investigations by the Du Pont Company. It also contains published reports of investigators at agricultural experiment stations and other institutions as related to the Company's products and other subjects of agricultural interest.



AGRICULTURAL NEWS LETTER

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The AGRICULTURAL NEWS LETTER serves as a medium of reporting new developments and new ideas in the field of agriculture, particularly as they are related to advancements through research. Material appearing herein may be reprinted in whole or in part, in the interest of advancing the general knowledge of new agricultural practices.

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WHAT FARM EDITORS ARE SAYING --

"Farmers have increased their productivity per man and per acre to earn better living standards for their families as they learned to apply this new knowledge. There remain vast new possibilities of increasing farm production through research." -- Charles B. Shuman, President, American Farm Bureau Federation in THE NATION'S AGRICULTURE

"We farm in an era that brings us equipment and facilities of marvelous effectiveness -- led by chemicals, machinery and electricity. Let us never get so familiar with these modern agricultural Aladdins and the powers thus invoked that we grow heedless and neglectful in their safe operation and use." -- Cap Mast in AGRICULTURAL LEADERS' DIGEST

"Insects, plant diseases and weeds have made it necessary to abandon crops in the past. But with modern, improved methods of coping with them they are kept within reasonable bounds." -- John F. Case in MISSOURI RURALIST

"It stands to reason that a country as highly industrialized as the United States cannot long support and carry on an agricultural industry that does not keep step in this direction." -- Herbert L. Schaller in BETTER FARMING METHODS

"The agricultural chemicals industry should become and must become one of the most scientifically managed of our industries, for care and control must be exercised from the concept of a research idea through the final application of the marketed product." -- Walter J. Murphy in JOURNAL OF AGRICULTURAL AND FOOD CHEMISTRY

"A fellow must do a lot of reading and studying these days to keep up with the fast changing times and methods of farming if he expects to be able to compete with the other fellow who does!" - TENNESSEE FARMER

"Thoughtful persons seldom stop thinking ahead when a new discovery appears labeled 'not yet significant in any practical way.' Who knows what science will apply after some rather vague piece of basic research is announced? Agricultural history is full of instances where practical application followed pure scientific discovery." -- Cap Mast in AGRICULTURAL LEADERS' DIGEST

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Incubator temperatures can be kept constant regardless of outside temperature with this installation of air-conditioning equipment in the hatchery described below. The ducts bring 68 to 70-degree air from a 20-ton air-conditioning unit to within eight inches of the intake on each incubator. Good results have been obtained during the past four years.

AIR-CONDITIONED CHICKS

By Prof. James E. Hill
Head, Poultry Husbandry Dept.
Mississippi State College

A great deal of controversy has occurred during the past few years as to the best method of hatching chicks. Although J. P. Clayton of the Mississippi Hatcheries at Jackson, Miss., does not necessarily claim to have the best method of producing chicks, he does have a unique system that is getting the job done and he certainly has no desire to change back to the old system.

The statement "old system" is correct when it is compared to the modern "air-conditioned" building in operation today. Now there are a great number of air-conditioned hatcheries in operation today, but the great difference is that the Mississippi Hatcheries goes one step further and air conditions the incubators.

The story behind the air-conditioned incubators is quite interesting, but after talking with Clayton one learns this is only one step in producing a chick that will live, grow, and perform as it should, for the producer to realize the most profit possible.

A few years back Clayton realized that the hot summer months in the south almost always resulted in lowered fertility and hatchability. He felt that a hatcheryman should immediately enter into a program that would help combat some of the losses in eggs and chicks caused by the summer heat.

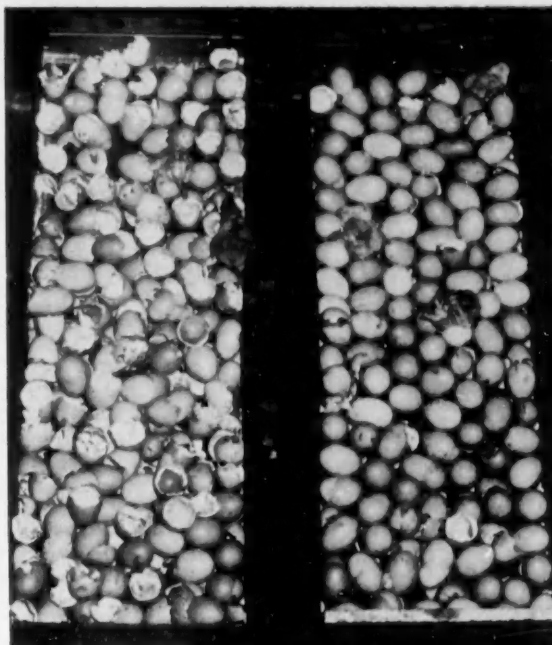
The problem at the start involved three factors: (1) determining the best method of transporting the many out-of-state eggs being shipped in and still maintain their hatching quality; (2) a program of producing eggs during these hot summer months which would still maintain fertility and hatchability; and (3) a method of keeping constant temperature in the incubators and at the same time bring in fresh air all the time.

The first problem, that of transporting the eggs, was quickly and successfully settled. The Mississippi Hatcheries purchased a fleet of refrigerated trucks. Now, all hatching eggs can be hauled a great distance without significantly reducing the hatchability.

The eggs are loaded, not thrown, in the trucks and a constant temperature of approximately 65 degrees is maintained throughout the entire trip. After arriving at their destination, the eggs are unloaded directly into egg coolers where they are held until trayed for the incubators. By following this practice of transportation and handling, the over-all hatchability is reduced very little, if any. At the same time, Clayton is quick to state that the shorter the distance, the better.

The second problem, that of local hatching egg production, was one which required a great deal more time and planning. The first thought was whether to own all the flocks or to contract hatching eggs from local producers. This problem settled itself on an approximate 50-50 basis in that 25,000 hens are on Clayton's personal farm and another 20,000 hens are under contract.

Realizing that under this plan there could be a great deal of variation, a policy was formulated whereby all flocks



Here's the sad story of what happens when eggs are not cooled properly. The number of unhatched eggs in the tray at right resulted from improper cooling, while the better hatch in the tray at left was due to use of air conditioning.

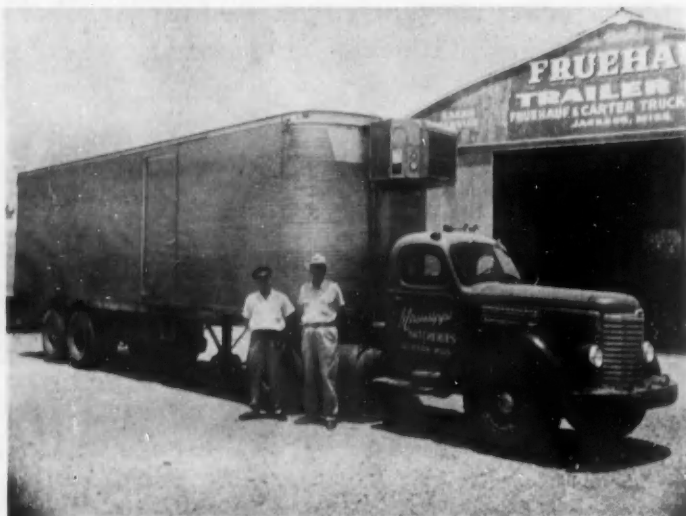
would be supervised by special service men employed by the Mississippi Hatcheries at no expense to the flockowner. Also, it was required that each flockowner must have an egg cooler capable of handling one week's supply of eggs.

The Clayton plan for raising replacement stock is quite similar to other conventional methods. However, he does have what he calls a few "pet" ideas that are his own.

A partial restricted feeding plan is followed in raising his replacement flocks, in which the birds are consuming a great portion of the ration in the form of oats by the sixth week of their life. This partial restricted feeding plan is followed to the point at which the pullets start laying, shortly after they are six months old. By bringing the birds in at this age he feels that the number of pullet eggs produced are kept to a minimum.

At the time the pullets are in good production they are receiving a ration of 60 per cent oats and 40 per cent breeding mash. The body weight of the birds is checked often to prevent them from getting too fat.

No roost poles are used in any of the houses. To prevent the birds from roosting on the nesting stands, all nests are closed by five o'clock in the afternoon and opened by five o'clock the next morning. One would think that there would be an excessive amount of floor eggs with this plan, but Clayton says floor eggs are very few after the pullets become accustomed to this type of management.



Air conditioning for hatching eggs starts in this refrigerated truck which hauls eggs to the hatchery from distant breeding farms.

All eggs are gathered a minimum of two times daily during the winter months and four times daily during the summer months. The eggs are gathered in plastic covered baskets and carried immediately to the egg room. There they are cooled for 24 hours and then packed in cases.

In the past it was thought the most profit could be obtained by replacing the hens every six months. But, with the reduction in the price of hens and

closer supervision, all hens are now kept for eight months. The hens on all farms are staggered in such fashion that a uniform supply of eggs can be obtained during the entire 12-month period.

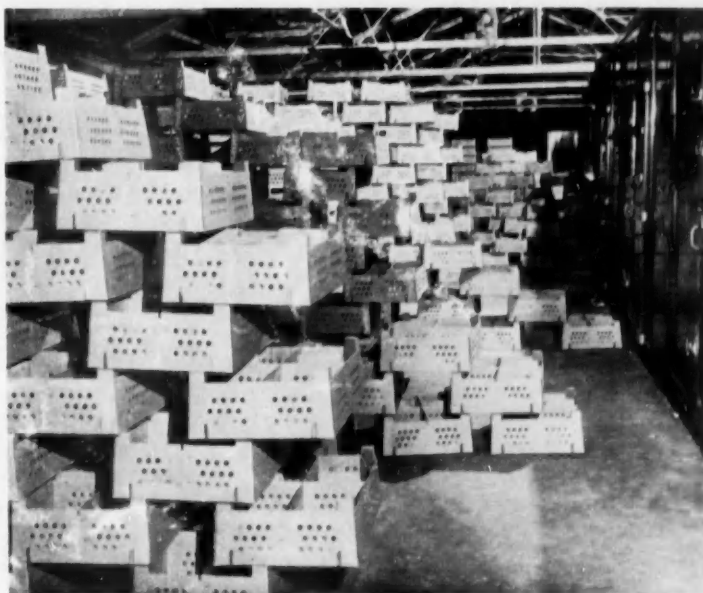
Another Clayton plan is followed in the rearing of young cockerels. Probably the number one problem encountered in the rearing of cockerels is the number that can be lost by fighting. After observing young and old males together in breeding pens and noticing that the old birds had a tendency to stop fighting among the younger birds, Clayton thought it might be a good policy to place a few old males with the young cockerels. This plan resulted in almost eliminating the loss of young cockerels due to fights.

The third problem, that of keeping a constant temperature in the hatchery and incubators along with some more Clayton ideas on how a hatchery should be operated, is probably the most interesting phase of the operation.

In this modern day where most everything is operated with automatic gadgets, one would think that in an air-conditioned hatchery having close to one million capacity that even the front door would open automatically. This is not true in the Mississippi Hatcheries. All eggs are turned every three hours by hand. That is to say, no automatic clock is used. All temperature and humidity readings are taken each hour and these readings are made from the inside of the incubator. No readings are taken from the outside.

Some broiler producers believe the chick should be the thermometer. Well, Clayton believes the operator should know more about hatching chicks than any automatic device. He feels there is always a chance that a fan can go out in a machine and that it would not show up on a recording device until such time that the hatch could be reduced considerably.

Therefore, a man enters each machine every hour on the hour for 24 hours each day to check the fans, temperature,



Boxed chicks, ready for shipment, are held in this air-conditioned room until time of delivery to the purchaser. The staggered stacking shown further aids air circulation to each box of chicks.

humidity and over-all internal condition of the machine. By following this practice it does mean a slight increase in labor costs, but Clayton thinks it pays off in the long run.

The air-conditioned phase of the hatchery has been in operation now for approximately four years. This unit consists of a 20-ton air-conditioning unit and a long line of ducts that lead from the unit to each incubator. These ducts stop about eight inches from the intakes to each machine and are regulated by increasing or decreasing the amount of air going into the intake vent.

The air coming in from these ducts ranges from 68 to 70 degrees and by properly regulating the intake vents, the incubator temperature can be held at almost any level regardless of the outside temperature. This unit is in the process of being reconditioned for use during the winter months, to constantly supply fresh warm air to the intake vent of each incubator.

The air conditioning does not stop with the incubators. There are vents opening into the hatchery, to keep the building at a constant temperature. When the chicks are taken from the machines and placed in chick boxes, they are kept at a constant temperature until they leave the hatchery. Chicks may get too hot after they leave the hatchery, but Clayton states quite emphatically that there is no sweat in evidence when they go into the trucks for delivery.

Yes, after talking with J. P. Clayton a person realizes that the hatchery business has come a long way from the time when no cooling devices were available, and even part of the heat was furnished by the eggs.

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EDITOR'S NOTE: The above article first appeared in a recent issue of "Hatchery and Feed" and is reprinted here with the permission of that publication and of the author. The air conditioning of livestock housing facilities is receiving increased attention at a number of experimental stations. Reports on their work in this field will appear from time to time in this news letter.

* * * * *

* "HOW TO RAISE A BOY" *

* The inspiring 27-minute motion picture of farm family *

* life, "How to Raise a Boy" produced for Du Pont's TV program, *

* "Cavalcade of America," and shown on coast-to-coast network *

* last spring, is now being made available on loan, without *

* charge, by the Du Pont Company, and also through Farm Film *

* Foundation, 1731 Eye St. N.W., Washington 25, D. C. The *

* film is on 16 mm. sound prints. Requests should specify *

* first, second, and third choice dates, well in advance. *

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SCIENTIFIC ADVANCEMENTS HAVEN'T
CREATED NEW SET OF HUMAN VALUES

We may rely on the technological developments of modern industry to kill our insect pests, plow our fields, or pick our cotton -- but science isn't promising any magic formulae for the human characteristics that make for success or failure in life, whether that life be led on a farm or in the environs of industry.

Henry B. du Pont, a vice president of the Du Pont Company, expressed this thought recently in addressing the graduating class of an eastern college.

"The emphasis we place now on science and technology sometimes leads us to overlook the fact that the personal qualities necessary for success in life are no different today than they were 50 or 100 years ago," he pointed out.

"Many of us, of course, dislike to face this disturbing and often disagreeable, truth, but there is no way around it. Unfortunately, the human fundamentals have not changed by the advent of automation. The old-fashioned virtues of persistence, of determination, and initiative have not yet been displaced by a portable Univac, or made available in synthetic form through the wonders of chemistry."

Since a farm business must be based on the same firm foundation as any other business to achieve success, Mr. du Pont's code of successful operation should be of interest:

"A successful business is one that takes on the hard jobs, the jobs calling for something special in the way of talent and resources, the jobs others don't or can't do. The successful companies are those which have not been content with the ordinary, but which open up new trails through new products and processes.

"A successful business knows that what it can give will, in the long run, be more important than what it can get, for what it can give will determine what it can get or whether it can continue to get anything at all.

"A successful business is a listener, for it is only by being attentive to the needs and aspirations of its various publics that it can keep abreast of its opportunities.

"Finally, a successful business charts its own course well ahead of the fact and works toward that end. Its research program, for example, is a means of insuring its progress. It looks ahead and strives to prepare itself for attaining its objective."

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EDITOR'S NOTE: Readers wishing complete text of Mr. du Pont's speech from which the above article was taken will be sent one on request.

SEED TREATMENT PROTECTS SEEDLING OATS
AGAINST DISEASE AND RESULTS IN BETTER STANDS

By J. A. Lyle*

Chemical treatment of seed has become a standard practice in the production of many major crops. It should also become a standard practice for oat production.

Good seed germination of oats is only the first step toward getting a good stand. Many harmful organisms exist on the seed and in the soil, ready to attack the young plants as soon as the seed begin to sprout. These organisms cause seed rot, seedling blight, damping-off, and other diseases.

Winter oats is one of our most satisfactory pasture, grain, hay, and winter cover crops. This is especially true with the better adapted varieties now available. Since oats are generally considered to be one of the best crops that will give early fall and winter grazing, any economical practice that increases the productive efficiency of this crop should be followed. Seed treatment would be classified as such a management practice.

Seed treatment tests with oats have been conducted during the past two years at substations of the API Agricultural Experiment Station.

Five chemical seed protectants were used. These were



Oats on right germinated better than those on left because they were treated with "Ceresan" M seed disinfectant, which killed seed-borne disease organisms.

"Agrox," "Ceresan" M seed disinfectant, "Orthocide" 75, "Panogen", and "Vancide" 51. Each material was applied to oat seed at the rate recommended by the manufacturer. The oats were seeded at the rate of two bushels per acre.

In general, "Ceresan" M was the most effective seed protectant used. This material also was the most effective one used in greenhouse and laboratory tests. The difference in laboratory germination of oat seed, untreated and treated with "Ceresan" M, is illustrated in the accompanying photograph.

Treatment of seed with chemical protectants results in increased field stands of oats in two ways: (1) the chemicals kill seed-borne diseases, and (2) they protect the seed during germination from soil-infesting disease organisms.

"Ceresan" M and other organic mercurials have proved to be more effective for oat seed treatment than other types of chemical seed protectants. These chemicals give off fumes that penetrate the hulls of oat seed and kill the organisms underneath. This was demonstrated in both greenhouse and laboratory tests, where "Ceresan" M was very effective for control of Victoria blight, the most serious seedling disease of oats in Alabama.

Many factors such as weak seed, unfavorable weather, and unfavorable soil conditions may affect the oat stand obtained from any seeding. Seed treatment provides protection against seed-borne and soil-borne organisms.

Seed-treating chemicals are not fertilizers or nutrients. These materials protect the seed against certain disease organisms and substantially improve the chances for survival of each seedling. Very often the protection given weak seeds by chemical treatment will enable them to germinate and produce seedlings, which they could not do without seed treatment. As a result, fewer failures to get a good stand of oats occur and fewer irregular stands are obtained.

The cost of seed treatment varies with cost of material, rate of application per bushel, and amount of seed used per acre. It may range from one and one-half to 20 cents per bushel.

Seed treatment is worth many times what it costs. Advantages of seed treatment are:

- (1) It destroys seed-borne organisms that cause plant diseases.
- (2) It checks organisms in the soil that rot the seed or kill the seedling.
- (3) It results in better quality grain by eliminating seed-borne diseases that shrivel and otherwise damage the kernels.

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*Head, Department of Botany and Plant Pathology, Alabama Polytechnic Institute. This report was originally published in "Highlights of Agricultural Research," Vol. 2, No. 2, API Agricultural Experiment Station.

NYLON-COTTON WORK GLOVES
GIVE DOUBLE WEAR IN TEST

Work gloves which will outlast conventional gloves by better than two to one are among the latest contributions of that amazing man-made fiber -- nylon.

The gloves are made of a heavy-duty canton flannel of cotton, strengthened with 50 per cent nylon. Tests made in industrial jobs where glove wear is severe indicate that these new gloves offer similar cost savings for farm work where gloves are customarily worn. These savings actually ranged from 21 to 38 per cent -- quite an item in cases where sizable field or packing house crews are being supplied with gloves.

The actual tests were conducted at the Linden, N.J., body-finish plant of General Motors. A total of 72 pairs of three types of gloves was worn alternately in finishing welded body seams by filing and polishing with emery. On such jobs, the average wear-life for 100 per cent cotton gloves was only 6.9 hours, but gloves with nylon blended into the palms withstood the same tasks for 10.9 hours, while a top average performance record -- 14.9 hours -- was chalked up by gloves with both palms and backs of nylon-cotton blend.

Despite higher original costs, the nylon reinforced gloves more than paid their way. The all-cotton gloves cost only \$2.60 per dozen, but it took \$5.72 worth of these gloves to equal the performance of one dozen gloves with nylon-cotton backs and palms costing \$3.45 -- a net saving of \$2.27 on each dozen of the new gloves. Gloves with nylon reinforcing in the palms alone cost \$3.25 per dozen and showed a savings over straight cotton gloves of 91 cents per dozen.

The test showed also the importance of proper fit in work gloves. Gloves with extra long fingers tended to wear excessively at the fingertips, significantly shortening wear life.

The fabric for the test gloves was selected as the result of laboratory studies which showed significantly greater abrasion resistance for the 50/50 nylon-cotton blend than for lower nylon-content blends tested.

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* AGRICULTURAL ECONOMICS *
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"Our American farmers use 7,000,000 tons of steel every year -- more than is used in the entire automobile industry," says Milo K. Swanton, executive secretary of the Wisconsin Council of Agriculture. "Farmers use 50 million tons of chemicals annually, or five times the amount they used in 1935," he adds.

PLANNING YOUR HUNTING TRIPS?

SAFE SHOOTING BAGS MORE GAME

A good spring hatching season and a nearly ideal summer for the development of game birds and other small game may mean better hunting this fall than for the past several years, according to reports from sportsmen across the country.

With a new crop of hunters slated to head for the fields and woods as the gunning seasons open, Henry P. Davis, public relations manager for Remington Arms Company, Inc., is pointing out that proper respect for firearms can pay off in terms of more game in the bag, as well as in helping assure that we make the 1955 hunting season a safe one.

"Safe shooting means better marksmanship," he stresses, and then goes on to outline these safe gun-handling tips which both beginners and experienced gunners need to impress on their memories:

"NEVER point a gun at anything you do not want to shoot. Never leave your gun unattended unless you unload it first. Never climb a tree or fence with a loaded gun.

"Carry only empty guns, taken down or with the action open, into your automobile, camp, or home. Whenever you pick up a gun, whether you are indoors or outdoors, ALWAYS first point the muzzle of the gun in a safe direction and examine the piece carefully to make sure whether or not it is loaded.

"The pointing of a loaded or unloaded gun toward a companion is a violation of every principle of good sportsmanship. It is the unpardonable sin of shooting ethics. Do it just once and you have lost the respect and comradeship of your companion, and branded yourself as either a thoughtless novice or a careless, dangerous shooter with whom it is unsafe to go afield. WATCH THAT MUZZLE! Never indulge in 'horseplay' with firearms. This foolhardy practice has caused many fatal and near-fatal accidents.

"The leaving of loaded guns unattended is extremely dangerous. A companion may pick up one thinking it to be unloaded. If it is propped against a tree, car, or post, a frisking hunting dog may bump against it, knocking off the safety and stepping on the trigger. These things have happened!

"When you are resting in the field or woods, always lay your gun down flat, preferably unloading it first and with the muzzle pointing away from everybody. No one can enjoy a lunch looking down the muzzle of a gun, loaded or unloaded.

"In climbing over fences or obstructions, always first pass your gun over to your companion, or pass it through the

fence and lay it on the ground. A stumble or a fall might prove disastrous.

"Before loading your gun, always make sure that the barrel and action are free from obstructions. Foreign matter in the barrel causes more 'blown up' guns than any other factor. Should you stumble badly or fall and your gun muzzle touch the ground, always unload and look through the bore to be sure that it is not clogged with mud, snow, or other substance.

"If you are walking single file, and in front, keep your muzzle pointed forward. If you are walking behind your companion, see that your gun points away from him at all times. It is best to walk abreast in the field or woods, but in doing so, see that your muzzle is always pointed away from your companion. Never crowd your companion in the duck blind. Be sure that each of you has plenty of room in which to shoot safely.

"Never, NEVER pull a gun, loaded or unloaded, toward you from a boat, car, or through a fence. You are flirting with a date with the undertaker when you do this.

"Always see that your safety is ON until you are ready to shoot. Sudden jars and brushing against twigs or brush can release the safety catch without your knowing it. Examine it frequently.

"When you approach camp or your automobile, always unload your gun. Take it down or open the action before putting it away or setting it aside.

"Always make sure of your target before pulling the trigger. Take a good look.....and then look again! Never fire in the direction of a sudden sound. It may be caused by some farmer's livestock, or, worse still, another hunter. And this has happened, too!

"When you are in the woods or close cover, it is best to wear some article of bright color, preferably red. No deer goes prancing around wearing a red bandana.

"Be careful of shooting at flat, hard surfaces or the surface of water. Dangerous ricochets may result from such shooting.

"Be on the alert always. This will avoid confusion and allow you to bring your gun into action quickly. Alertness makes for good marksmanship. Carry your gun at the 'ready' position, hands on the fore-end and grip, muzzle about at eye-height. Adopt a free and easy attitude. This will allow you to bring your gun up to your shoulder quickly, get your cheek down on the stock easily, and permits the free swing which gets results.

"Watch your footing carefully. Try to always be in position to gain a solid, comfortable shooting stance which will allow quick co-ordination of mind and muscle."

SYNTHETIC FERTILIZER TESTED

O. R. Lunt and R. H. Sciaroni
University of California

"Uramite" fertilizer compound -- a combination of urea and formaldehyde -- is a type of recently developed plastic with many of the favorable characteristics of organic nitrogen.

Because the fertilizer is a synthetic product, there should be little variation in its properties such as occurs in many organic fertilizers which may vary greatly in different lots. This new product offers the advantages of nitrogen release over a long period of time; safety, because of low solubility; it is odorless, so it does not attract flies, nor does it seem to encourage algae growth on the surface of the soil after top dressings are made.

Most nitrogen sources -- except some organic types -- are readily soluble in water and are easily leached from the soil.

Nitrogen usually occurs in the soil solution either as nitrate or ammonium. Nitrate is not absorbed by soils and can easily be leached with normal irrigation practices. Ammonium is absorbed to some extent by the soil, but it too is rather easily leached in well-drained soils by average irrigation waters containing 500 to 1,000 ppm -- parts per million -- soluble salts. Even when an ammonia source of nitrogen is applied to a soil, about 80 per cent to 95 per cent of it is converted to nitrate in two to three weeks under average growing conditions. Therefore, in ornamental plantings where prepared soil mixes -- which drain readily -- are usually used, nitrogen levels are especially difficult to maintain.

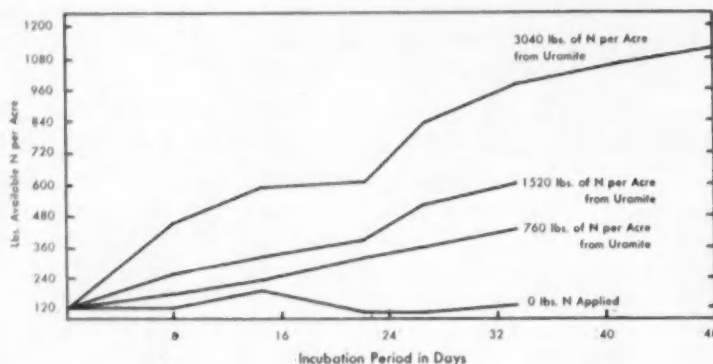
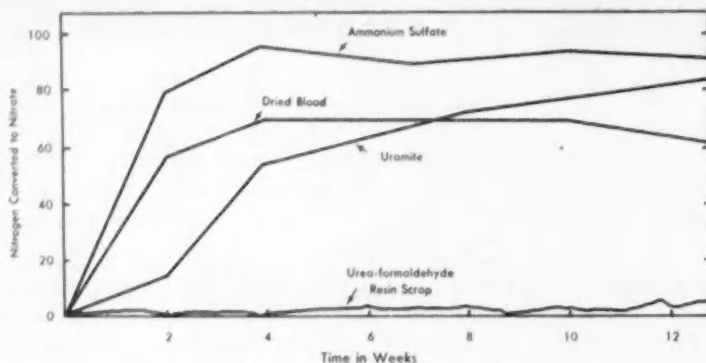
With organic sources of nitrogen -- hoof and horn meal -- dried blood, cotton-seed meal, and others -- only a portion of the nitrogen is immediately soluble. The remainder must be mineralized over a period of time before it is available to the plant or susceptible to leaching.

In general, organic nitrogen sources have had two principal advantages: 1. Initial solubility is usually low, thus minimizing the dangers of over-fertilization, with resulting salt damage. 2. Nitrogen is mineralized to the available forms over a period of time, thus helping to maintain a more uniform supply.

Mineralization of organic nitrogen takes place over a shorter period of time than is rather widely believed. Other research workers have shown that under favorable soil conditions about 80 per cent to 85 per cent of the organic nitrogen -- which was eventually mineralized during a growing season -- became available during the first three weeks after application. This was true whether the recovery of nitrogen was low -- 20 per cent of total -- or high -- 50 per cent of total.

Laboratory and field tests with "Uramite" containing about 38 per cent nitrogen showed that the material was

mineralized to the available nitrogen forms over a considerable period. In most cases, as indicated in the upper graph on this page, the rate of mineralization reached a peak during the third to fifth week after application, but two months after treatment it was still high. No marked difference in rate of mineralization occurred in soils with relative acidity-alkalinity -- pH -- values between five and eight. A pH value of seven is considered to be neutral.



The tests also indicated that the rate at which additional nitrogen is made available from "Uramite" fertilizer compound drops to low values within three and one-half to four months after heavy applications are made. Therefore, even with a material such as "Uramite," fertilization may be necessary about three times a year to maintain nitrogen in good supply in well-drained soils under greenhouse conditions.

Data obtained in the laboratory indicate that about 10 pounds of "Uramite" per 100 square feet may be safely applied in a single application.

Field tests on greenhouse azaleas, carnations, roses, and snapdragons in both ground beds and raised benches have shown that five to six pounds of "Uramite" per 100 square feet broadcast as a top dressing produced no injury. In some cases, the treatments were repeated every three months, with no harmful effects. With potted plants -- poinsettia, Croft lily, chrysanthemum, cyclamen, hydrangea -- top dressings of one and one-half to two teaspoonfuls per six-inch pot produced no damage. The quality of the plant growth on the "Uramite" nitrogen program was excellent in all cases. With carnations, chrysanthemums, and hydrangeas, the quality of the plants was the best in the growers' experience.

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TESTING NEW CHEMICALS FOR SOUTHERN AGRICULTURE

By George A. Penny*

A lot of field hoe hands can be hired for \$2,500,000 and they can chop out a lot of grass and weeds from around crops in five years.

Hoe hands are scarce these days at prevailing farm wages, however, and that is one reason for an increased interest in herbicides that keep down grass and weeds but do no harm to crops.

One of those is "Karmex" DL herbicide, developed by the Du Pont Company, which spent an estimated \$2,500,000 before it could market the product commercially, after some five years of experimenting with it.

The testing of "Karmex" DL herbicide for pre-emergence weed control in cotton has been just one of many activities at a Du Pont experimental farm of 26 acres just south of Raleigh, N.C., where field crops annually receive treatments unique to farm land in the Southeast.

If the cotton, corn, tobacco, and peanuts on those 26 acres could talk, the experiences they would relate might predict the degree of control southeastern farmers will have over insect pests, plant diseases, and weeds several years from now. For this is an experimental farm of the Du Pont Company for testing new agricultural chemicals, and new uses for old ones.

This small farm, on land leased by Du Pont since 1951, was established in the Raleigh area because plants representative of the entire Southeast can be grown there. The farm is, in effect, an outdoor laboratory with two main goals: first, to find new chemical controls for insects, plant diseases, and weeds which are not satisfactorily controlled by existing compounds; and second, to test more economical and more effective chemical pesticides.

Aaron W. Welch, who received his Ph.D. degree in plant pathology from Iowa State College, has been in charge of the experimental work since 1953. Before joining Du Pont's Grasselli Chemicals Department in Wilmington, Del., in 1947, he had been a plant pathologist with the Iowa State Experiment Station and the U. S. Department of Agriculture.

Dr. Welch has a field assistant, Charles Watts, Jr., who helps in raising the experimental crops and checking test results.

* George Penny is a staff member of "The News and Observer" of Raleigh, N. C. He wrote the above article for his newspaper and has given us permission to reprint it since it so well describes one method by which Du Pont agricultural chemicals are tested carefully in each region of the country. Photos also by courtesy of the Raleigh paper.

Watts was born and reared near Raleigh, now lives at Auburn, N.C., and is well known in the local farming community.

The farm crops serve as initial proving grounds for new chemical compounds developed through Du Pont research. If these compounds perform well at the Raleigh farm and other Du Pont experimental farms, they are made available to state experiment stations for further study. They are next tested under large-scale operation methods in North Carolina, South Carolina, Georgia, Tennessee, Kentucky, and Virginia. These are cooperative tests conducted with leading farmers to determine whether the chemical will do its job under typical commercial practices.

Thus, Dr. Welch spends considerable time traveling through the Southeast, arranging for tests, observing the application of chemicals, studying the action of the materials on crops, and evaluating the results.

In addition to these tests, Dr. Welch is responsible for keeping up on southeastern agricultural problems which might be tackled with chemicals. At least once or twice a year he

travels over the Carolinas, Georgia, Tennessee, and Kentucky talking with farmers, extension workers, and research men. His reports provide one basis on which Du Pont decides whether new chemicals should be tested for various uses in the Southeast.

Work at this experimental farm has played an important part in advancing the use of agricultural chemicals in the South.

The first tests with the "Karmex" herbicides on this land were made in the 1952 season. Additional test work here and elsewhere during 1952 led to carefully supervised growth trials in 11 states in 1953. These tests confirmed experimental evidence that "Karmex" DL herbicide would give good control of weeds in cotton



Charles Watts, Jr., assistant at the Raleigh farm, shows how experimental sprays are applied, using a regular spray boom pressured by a tank of carbon dioxide.

with a satisfactory margin of safety for the crop when used according to directions.

Cotton acreage treated with "Karmex" DL herbicide in 1954 totaled over 9,000 acres. This year "Karmex" has been used commercially on cotton farms throughout the Piedmont and Delta cotton areas. When this chemical is used for pre-emergence weed control, at least one hoeing can be eliminated, and in some cases, as many as four hoeings have been eliminated. The cost of chemicals for doing the job with "Karmex" DL is about \$2.50 or less per acre of cotton.

As a result of using chemicals and mechanized planting and harvesting, it is expected that cotton will become a low-cost crop to produce.

"Karmex" and related compounds also are being tested at the Raleigh farm for use in other crops -- such as corn and peanuts.

Tobacco test plots at the Raleigh farm are a good example of the continuing search for better ways to do a job. Du Pont "Fermate" ferbam fungicide has long been used as a control for blue mold. Now, Dr. Welch is conducting tests to see whether "Manzate" maneb fungicide can be relied on to deliver equally good blue mold control at less cost.

Seed treatment of cotton to prevent seed rot, seed decay, soreshin and cotton anthracnose also has been studied in field tests on the Raleigh farm. Various rates of "Ceresan" M seed disinfectant have been tried, and combinations of "Ceresan" with various insecticides also are being tested.

Dr. Welch has just finished testing "Ceresan" on oats and wheat for smut, and reports "fine results."

Thus, test work with established compounds helps to develop new applications or more economical methods of using them, while laboratory research con-



Careful weighing of chemicals for each test plot, followed by accurate application and a complete set of data taken from field observations—these are the scrupulous details which go into testing of agricultural chemicals to determine their effectiveness and the proper dosage that must be recommended for most economical control of insects, plant diseases or weeds. Here Dr. Welch and his assistant prepare individual packets of material for each plot to be sprayed.

tinues to seek new compounds which may do an old job better, or do a new job that has never before been accomplished with chemicals.

To carry on this work, Dr. Welch has to be a combination of scientist, farmer, and practical mechanic. Without a "green thumb," he cannot expect to get results. But he also needs all the resources of his scientific training in entomology, plant pathology, plant physiology, chemistry, agronomy, and a host of other subjects.

Like most of Du Pont's topflight agricultural technical men, Dr. Welch grew up on a farm. He was raised on the eastern shore of Maryland, studied agricultural science, and brought to his job a practical knowledge of farming along with the scientific training which it takes to make agricultural research pay off -- for industry and for agriculture.

Dr. Welch refers to chemical and agricultural research as work in which there are 1,500 failures for one success, but that one success is like hitting the jackpot when playing a slot machine -- it pays off.

As farm technology increases, America will need more and more men like Dr. Welch to do research, to demonstrate new farming techniques, to teach them to the boys in school today who are the farmers of tomorrow, and to see to it that wherever new products are sold, the people who sell them and the people who buy them know how to get the best results.

* WOULD YOU BELIEVE IT, MR. MARX? *

* "Ownership by the people," that dream of the revo- *
* lutionary Karl Marx which has stirred nations to bloodshed *
* and political overthrow and has upset the world for 100 years, *
* seems to have become a reality under capitalism, while in *
* Russia where Marx is revered, his ideals have been "shredded" *
* on the jagged shards of 'state' bureaucracy." *

* As proof of this economic paradox, the Du Pont *
* Company has recently released a booklet entitled "The Story *
* of Creative Capital" -- an amazing record of the way in which *
* a million Americans invest over \$250,000,000 every business *
* day in the industries, farms, retail businesses, real estate, *
* and other assets of this country which they literally "own." *

* "Only when put to use do savings become capital, and *
* only when given direction in filling the needs of the market- *
* place does capital become creative," the booklet points out. *
* And under such a definition, it is difficult to find grown *
* American men and women who are not "capitalists," due to the *
* investments they make as a matter of course. *

* Copies of this booklet in pictures and text may be *
* obtained by writing "Agricultural News Letter." *

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* FARM-CITY WEEK *
* An Editorial *
*

* President Eisenhower has been asked to designate the week of October
* 23-29 this year as "Farm-City Week" and to dedicate it to better under-
* standing between farm and city people.

* The idea behind this week during which the importance of rural-
* urban interdependence and cooperation will be stressed is a good one -- but
* not new. It's been done on a county-wide basis in some sections of the
* country for a good many years. And without doubt it has contributed
* to a better feeling of mutual purpose between farm people and city
* dwellers.

* I well recall the annual farm-city dinners held in my home county
* during the mid-thirties -- deep in the depression. Local bankers were a
* good deal more involved in farming than they are today, and the speaker
* of the evening representing the farmers always had a few gleeful
* recommendations regarding the handling of manure and broody chickens on
* banker-owned farms.

* While it was some comfort in those times for farmer and businessman
* to rub elbows at the table, exchange viewpoints, and find that things
* were equally tough in town and out in the country, this same sort of inter-
* change is much more advantageous today. For farmer and urbanite are
* becoming more dependent on each other every year.

* Few farmers would care to go back to agricultural methods they
* were using even as recently as 20 years ago. They have come to expect
* industry to provide them with improved mechanical equipment, better
* chemical pesticides to protect their crops, modern conveniences for their
* farm homes.

* On their part, industry's workers are more dependent than ever on
* a constantly decreasing number of farmers to provide them with more food per
* capita than they ever consumed before. They also look to this dwindling
* farm population to provide fiber, wool, leather, and other components of
* our apparel and many textile needs, to say nothing of a growing reliance
* on certain farm-grown raw materials to sustain the operation of many
* vital processing plants.

* Technology -- that accumulation of man's ever-increasing knowledge
* and skills which has shaped our modern pattern of living -- is as much at
* home in a corn field as in a laboratory. The know-how that enables a
* Wyoming rancher to breed and raise modern-type cattle which produce more
* steaks and roasts per hundredweight on the hoof, is the same sort of
* technical skill that enables a chemist to produce a weed-killing compound
* to reduce hoeing labor in a cotton field.

* "Farm-City Week" should not serve to promote an understanding
* of "differences" which are today virtually non-existent between farm and
* city people. It should serve to point out mutual goals, mutual problems,
* and mutual solutions to those problems, which all Americans must share --
* no matter how many blocks or miles they live from City Hall.

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* EXPERIMENTERS' NOTATIONS *
*
* A Round-up of Data from Across the Nation *
*

A big pay-off resulting from disease-control treatments on cucumbers has recently been reported by L. O. Weaver of the University of Maryland. "In field plots in Maryland in the last three years, the use of fungicide sprays has increased yields of cucumbers approximately 28 per cent, 40 per cent, and 68 per cent respectively," he stated. The dithiocarbamate fungicides used and recommended in Maryland are: zineb at two pounds per 100 gallons of spray or a six per cent dust, and ziram at the same concentration in a spray or a 10 per cent dust. These are recommended to control three diseases -- downy mildew, *Macrosporium* leaf spot, and anthracnose.

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Worm infection of cattle in Illinois is costing owners an average of \$3 per head, according to Dr. N. D. Levine of the College of Veterinary Science at the University of Illinois. To prevent this loss, Dr. Levine recommends a system of pasture rotation to prevent both over-grazing and contamination, plus a two-fold program of medication based on the use of phenothiazine. The two steps of this latter program consist of (1) two purges with phenothiazine about three weeks apart, and (2) daily continuous doses of small amounts of phenothiazine.

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Where flue-cured tobacco is stored in warehouses not adapted to effective fumigation, aerosol applications of insecticides, such as pyrethrum, are being recommended by U. S. Department of Agriculture investigators to control the tobacco moth and the cigarette beetle. Adult tobacco moths leave their hibernating places in the spring, or the tobacco in the summer, to mate and lay eggs. During this period, which lasts several days, the moths are in flight a good part of the time and sprays applied in open spaces of the warehouses strike a large proportion of them.

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Notations from Texas A. & M. College point out the tremendous strides in agricultural aviation since the first experimental insecticide application by plane in 1919. One acre out of every six is now treated by aircraft with dust, spray, fertilizer, or other chemicals, they say. Private flying firms operate over 7,000 planes and annually apply 644,000,000 pounds of dust-type chemicals and 80,000,000 gallons of sprays. Aerial pest control, weed control, and fertilizing were credited with adding an estimated \$3 billion to annual farm income.



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